Plant-based meat alternatives (burgers, sausages, nuggets; pea/soy/wheat-protein base): HMTc Standard

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CORRESPONDENCE

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KEYWORDS

heavy metals, food safety, dietary exposure

PUBLICATION HISTORY

This revision 2026-08.

Abstract

The Heavy Metal Tested & Certified heavy-metal-safety standard for plant-based meat alternatives (burgers, sausages, nuggets; pea/soy/wheat-protein base) in Meat, Poultry, and Eggs, evaluated on as sold, finished formulated product (wet weight for chilled and frozen forms, product as placed on market for dry mixes); dry-commodity component maximum levels are applied to the hydrated finished product with no dry-to-wet conversion, which is the looser of the two available treatments and is disclosed as such, so certification additionally requires documented source-commodity compliance for every protein ingredient. 5 of 11 panel analytes publish a numeric limit taken from the strictest applicable government maximum; the remainder are held under mandatory control or a substantiated not-material determination.

1 | How every number on this standard is set

HMTc Method v2.0 (government-limit-only initial setting: the strictest applicable sovereign maximum level for this exact product form in its native basis; disclosed read-across where the exact cell is unregulated; control where neither a sovereign number nor a supportable near-neighbour analogue exists; never occurrence-derived)

2 | Master limit table

All values in ppb (µg/kg), as sold basis. A brand meeting every value qualifies for the mark.

ANALYTE	HMTC LIMIT	BASIS
Lead (Pb)	80	read-across (Hong Kong)
Cadmium (Cd)	40	read-across (EU 2023/915)
Total arsenic (tAs)	100	read-across (Codex)
Inorganic arsenic (iAs)	control	measured every lot; no human-food maximum
Mercury, total (tHg)	10	read-across (Hong Kong)
Methylmercury (MeHg)	n/m	not material in this matrix
Nickel (Ni)	800	read-across (EU 2024/1987)
Tin (Sn)	control	measured every lot; no human-food maximum
Aluminium (Al)	control	measured every lot; no human-food maximum
Total chromium (Cr)	1,000	screening ceiling (Hong Kong)
Hexavalent chromium (Cr-VI)	n/m	not material in this matrix

3 | Derivation — where each number comes from

Every cell traces to one named sovereign maximum level (the strictest for the nearest analog), or to an explicit control, not-material, or species-bounded determination. No occurrence statistic selects a certification value.

ANALYTE	HMTC	SOVEREIGN ANALOG / DETERMINATION
Lead (Pb)	80	read-across (Hong Kong)
Cadmium (Cd)	40	read-across (EU 2023/915)
Total arsenic (tAs)	100	read-across (Codex)

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Inorganic arsenic (iAs)	control	No credible sovereign government sets an inorganic-arsenic maximum level for pulses, peas, soy beans, wheat gluten or a plant-protein meat analogue. Every credible inorganic-arsenic instrument on the register is scoped to rice and rice products, fruit and vegetable juices, infant foods, or seafood. A not-material determination is REJECTED because a real and formulation-dependent inorganic-arsenic pathway exists in this row: rice protein and rice flour are common binders and protein extenders in meat analogues, and rice is the single most arsenic-accumulating food crop. The cell is therefore a control with a formulation-triggered reflex, and no ceiling is invented for the non-rice formulation.
Mercury, total (tHg)	10	read-across (Hong Kong)
Methylmercury (MeHg)	n/m	Methylmercury is formed by microbial methylation in aquatic sediment and biomagnifies through aquatic food webs. A plant-protein meat analogue carries no methylation pathway and no aquatic trophic transfer, and methylmercury is in any event a component of total mercury (MeHg <= tHg), so it is bounded by and controlled through the published total-mercury cell (10 ug/kg total mercury, Hong Kong Cap. 132V vegetables row covering the pulse and legume-vegetable protein components). No separate methylmercury ceiling is published because none would bind below the total-mercury ceiling and none is set by any credible sovereign government for this product form.
Nickel (Ni)	800	read-across (EU 2024/1987)

Tin (Sn)	control	Inorganic tin in food is a tinplate-packaging pathway: tin migrates into the food from the internal surface of an unlacquered or damaged tinplate can, which is why every credible sovereign tin maximum level on the register is written against canned food rather than against the food itself. A chilled, frozen or film-packed plant-protein meat analogue is not packed in tinplate, so the pathway that the canned-food maximum levels exist to control is absent and no sovereign number governs the cell. A lot of this product form that is retorted or packed in a metal can is not certified against this row at all: it is certified against the canned-meats row, whose tin cell carries the binding canned-foods maximum level. No tin ceiling is invented for the non-canned form.
Aluminium (Al)	control	No credible sovereign government sets an aluminium maximum level for pulses, soy, wheat gluten or a plant-protein meat analogue. The credible aluminium values on the register are drinking- and bottled-water statutory limits, a food-contact specific-migration limit, toy element-migration limits, and the FSANZ infant-formula maximum levels; none can anchor this row, and an adult food must not borrow an infant-formula value. No read-across is supportable and no ceiling is invented. Aluminium nonetheless warrants a named control on this row specifically, because aluminium-containing acidity regulators, firming agents and anti-caking agents are permitted in formulated plant products and because protein isolation uses aluminium-bearing processing equipment.
Total chromium (Cr)	1,000	screening ceiling (Hong Kong); Pulses

Hexavalent chromium (Cr-VI)	n/m	Hexavalent chromium is not stable in this matrix. A hydrated, cooked, high-protein extrudate is a reducing medium; Cr(VI) is reduced to Cr(III) by plant-matrix reductants (ascorbate, phenolics, thiols) and by the heat and shear of high-moisture extrusion, so a Cr(VI) figure reported on such a matrix is an artifact of the extraction chemistry of the total-chromium screen rather than a measurement of a species that persists in the food. The determination follows the reference-method adjudication recorded for the hexavalent-chromium cell in the infant-formula category, applied here to a plant-protein extrudate. Hexavalent chromium is in any event a species of, and bounded by, the published total-chromium screen (Cr-VI <= total Cr).

4 | Cite this standard

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References

[1] Hong Kong
Binds Pb, tHg, Cr.
MAXIMUM LEVEL

[2] EU 2023/915
Binds Cd.
READ-ACROSS

[3] Codex
Binds tAs.
READ-ACROSS

[4] EU 2024/1987
Binds Ni.
READ-ACROSS

STATUS AND LICENCE

A normative certification standard, editorially reviewed and version-controlled in-house; every value traces to a named

COMPETING INTERESTS

This standard is published by the Heavy Metal Tested & Certified (HMTc) program, operated by the Institute of

sovereign maximum level, disclosed in the derivation. © 2026 Institute of Contaminant Standards / Heavy Metal Certified. All rights reserved.

Contaminant Standards. Its statements about government regulations, toxicology, and occurrence are sourced to the cited primary and expert-body records and to the independently maintained Heavy Metal Index; the program's own certification thresholds are not used as evidence for any factual claim made here.

DATA AVAILABILITY

The works this standard draws on are listed in full in the references above and on the standard page at https://heavymetalcertified.com/standards/plant-based-meat-alternatives. Primary legal instruments and expert-body assessments are named with their public identifiers; the underlying occurrence and toxicology corpus is maintained on the Heavy Metal Index.

PUBLICATION HISTORY

This revision 2026-08. The full dated record is maintained at https://heavymetalcertified.com/standards/plant-based-meat-alternatives.